

Structural Metal Fabricators and Fitters

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What They Do

Without Structural Metal Fabricators and Fitters, there would be no suspension bridges, sports arenas, skyscrapers, or aircraft of any kind. Structural Metal Fabricators, also called Shop Ironworkers, make and assemble structural metal products such as frameworks or shells for machinery, ovens, iron staircases, tanks, stacks, and metal parts for buildings and bridges. They assemble steel columns, beams, reinforcing steel, and other basic metal parts of large structures used at construction sites such as bridges and buildings. They make stairs, ornamental grilles, beams, and girders and also make and assemble units for prefabricated metal buildings. All their work is performed in shops or yards.

Structural Fabricators ordinarily work with large shapes and thick, heavy materials—individual pieces may weigh as much as 20 tons. Both fabricators and fitters use large cranes, hoists, and derricks to lift or move materials and finished products.

Structural Metal Fitters lay out, position, align, and fit together fabricated parts of structural metal products preparatory to welding or riveting. Both fabricators and fitters read and follow job orders and blueprints to guide their work. Fabricators generally work in shops, while fitters usually work at construction sites.

Tasks

Fabricator

- ▶ Develop layout and plan sequence of operations for fabricating and assembling structural metal products, applying trigonometry and knowledge of metal.
- ▶ Locate and mark bending and cutting lines onto workpiece, allowing for stock thickness and machine and welding shrinkage.
- ▶ Set up and operate fabricating machines, such as brakes, rolls, shears, flame cutters, and drill presses.
- ▶ Set up and operate machine tools associated with fabricating shops, such as radial drill, end mill, and edge planer.
- ▶ Preheat workpieces to render them malleable, using hand torch or furnace.
- ▶ Hammer, chip, and grind workpiece to cut, bend, and straighten metal.

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- ▶ Verify conformance of workpiece to specifications, using square, ruler, and measuring tape.
- ▶ Design and construct templates and fixtures, using hand tools.
- ▶ Position, align, fit, and weld together parts, using jigs, welding torch, and hand tools.

Tasks

Fitter

- ▶ Align parts, using jack, turnbuckles, wedges, drift pins, pry bars, and hammer.
- ▶ Move parts into position, manually or by hoist or crane.
- ▶ Mark reference points onto floor or face block and transpose them to workpiece, using measuring devices, squares, chalk, and soapstone.
- ▶ Give directions to welder to build up low spots or short pieces with weld.
- ▶ Heat-treat parts with acetylene torch.
- ▶ Straighten warped or bent parts, using sledge, hand torch, straightening press, or bulldozer.
- ▶ Locate reference points, using transit, and erect ladders and scaffolding to fit together large assemblies.
- ▶ Remove high spots and cut bevels, using hand files, portable grinders, and cutting torch.
- ▶ Set up face block, jigs, and fixtures.
- ▶ Examine blueprints and plan sequence of operation, applying knowledge of geometry, effects of heat, weld shrinkage, machining, and metal thickness.

Detailed descriptions of these occupations may be found in the Occupational Information Network (O*NET) at online.onetcenter.org.

Important Skills, Knowledge, and Abilities

- ▶ Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.
- ▶ Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures.
- ▶ Operation and Control — Controlling operations of equipment or systems.
- ▶ Mathematics — Using mathematics to solve problems.
- ▶ Equipment Selection — Determining the kind of tools and equipment needed to do a job.
- ▶ Manual Dexterity — The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.
- ▶ Control Precision — The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.
- ▶ Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Work Environment

Working conditions vary for Structural Metal Fabricators and Fitters, depending on plant size, industry worked in, and product manufactured. For instance, fitters in the aerospace industry often work in tight, hard-to-reach locations on aircraft, such as fuselages or gear boxes. Most work

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stations are temperature controlled and well-lighted. As with any use of power and hand tools, injury is possible, but the work is generally safe for those who take reasonable care, use protective eye and ear equipment, and adhere to safety rules. Tools such as drills, flame cutters, brakes, and edge planers can be loud and emit odors.

Many Structural Metal Fabricators and Fitters are members of labor unions. These include the International Association of Machinists and Aerospace Workers; the United Electrical, Radio and Machine Workers of America; the United Automobile, Aerospace and Agricultural Implement Workers of America; the International Brotherhood of Electrical Workers; and the United Steelworkers of America.

California's Job Outlook and Wages

The California Outlook and Wage table below represents the occupation across all industries.

Standard Occupational Classification	Estimated Number of Workers 2004	Estimated Number of Workers 2014	Average Annual Openings	2006 Wage Range (per hour)
Structural Metal Fabricators and Fitters				
51-2041	7,900	8,800	280	\$11.06 to \$20.78

Wages do not reflect self-employment.

Average annual openings include new jobs plus net replacements.

Source: www.labormarketinfo.edd.ca.gov, Employment Projections by Occupation and OES Employment & Wages by Occupation, Labor Market Information Division, Employment Development Department.

Trends

While the projected employment growth for Structural Metal Fabricators and Fitters is slower than average for all occupations in California between 2004 and 2014, a significant turnover is expected: 1,900 openings will occur during that time as workers leave for other kinds of work or retire. Workers with computer-aided design (CAD) and computer-controlled machine knowledge will have the best job prospects.

Training/Requirements/Apprenticeships

Structural Metal Fabricators and Fitters usually follow one of the following training paths:

- ▶ Formal, four-year apprenticeship
- ▶ Vocational school
- ▶ Community college programs or certificates
- ▶ Extensive on-the-job training

There are currently four recognized apprenticeable specialties associated with this occupation: Former, Hand; Metal Fabricator; Ship Propeller Finisher; Fabricator-Assembler, and Metal Products.

Recommended High School Course Work

High school students interested in this type of work should take mathematics, blueprint reading, and metal shop courses.

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Where Do I Find the Job?

Candidates for training or apprenticeship programs should apply directly to employers who employ Structural Metal Fabricators and Fitters. Community colleges offer assistance in finding jobs to completers of certificate programs. Unions representing these workers also have information concerning apprenticeships and related matters.

Use the *Search for Employers by Industry* feature on the *Career Center* page at www.labormarketinfo.edd.ca.gov to locate employers in your area. Search under the following manufacturing industry names to get a list of private firms and their addresses:

- ▶ Fabricated Structural Metal
- ▶ Metal Window and Door
- ▶ Ornamental and Architectural Metal Work
- ▶ Plate Work
- ▶ Prefabricated Metal Building & Component
- ▶ Sheet Metal Work

Search these **yellow page** headings for listings of Contractors and private firms:

- ▶ Metal Fabricators
- ▶ Sheet Metal Work

Where Can the Job Lead?

Experienced Fabricators and Fitters may become members of research and development teams, working with engineers and other project designers to design, develop, and build prototypes, and test new product models. Those with a background in math, science, and computers may advance to become Numerical Tool and Process Control Programmers or Operators of more highly automated production equipment.

Other Sources of Information

National Institute for Metalworking Skills
www.nims-skills.org

Get Tech
www.gettech.org

Precision Metalforming Association Educational Foundation
www.pmaef.org